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Abstract

RESEARCH PROGRAMME AND OPERATING EXPERIENCE ON WWR-S REACTOR

F. Musílek, F. Berger, L. David, Z. Hrdlička, B. Stočes,
J. Urbanec, F. Voženílek and V. Zajíc

The report deals with the reactor use by scientific laboratories and with the works aimed at its improvement and development.

(a) The first part of the report, which is devoted to the reactor exploitation, contains a survey of all experimental works carried out in the fields of nuclear physics, reactor physics and nuclear technology.

These investigations refer first of all to the study of radiation capture of thermal neutrons using the method of gamma ray spectrometry of different nuclei, determinations of the spin characteristics of the levels in compound nuclei by angular correlation measurements in radiation capture, the studies on obtaining polarized neutron beams by reflection on a cobalt mirror and the design of a neutron spectrometer with a mechanical chopper. In the field of nuclear technology the studies on two experimental loops in the reactor core are given. The first loop is aimed at the study of a carbon dioxide cooled fuel element and the second at the corrosion study of some materials in water situated in a radiation field.

(b) In the second part studies are reported on reactor physical characteristics as well as on the changes and improvements which were or will be performed in the reactor. The measurement results of absolute fluxes of thermal and resonance neutrons using activation methods and the distribution of fast neutron absolute fluxes and fast neutron spectra using threshold detectors in irradiation channels of the reactor core are given. For increasing experimentation and irradiation capacity the project of reactor core reconstruction will be realized which will permit doubling the nominal value of the reactor power. The project of a facility for automatic sample inserting and removing in or from the reactor core, the potentiality of using

an apparatus for measuring corrosion losses of stainless steel and aluminium reactor components using non-destructive methods are described and the experiences are surveyed which were gained during the operation of the instrumentation for a complex automatic reactor control using moving detectors.

(c) In the conclusion the experiences are summarized comprising the co-operation of the reactor laboratory with other scientific laboratories, experimental capacity of the WWR-S reactor as well as experimental work programming.